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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte BILLY FRANKLIN BEASLEY JR.,
ANTHONY LOUIS CROSS, ROBERT MICHAEL SCHOCK,
JOHANNES W. VAN DE CAMP, PAM A. HORINE, and
TERRI L. SMITH

Appeal 2009-0075
Application 10/656,416
Technology Center 1700

Decided:¹ April 28, 2009

Before, EDWARD C. KIMLIN, PETER F. KRATZ, and
MICHAEL P. COLAIANNI, *Administrative Patent Judges*.

COLAIANNI, *Administrative Patent Judge*.

DECISION ON APPEAL

¹ The two-month time period for filing an appeal or commencing a civil action, as recited in 37 C.F.R. § 1.304, begins to run from the Decided Date shown on this page of the decision. The time period does not run from the Mail Date (paper delivery) or Notification Date (electronic delivery).

This is a decision on an appeal under 35 U.S.C. § 134 from the Examiner's final rejection of claims 1 through 22, all of the claims pending in the above-identified application. We have jurisdiction pursuant to 35 U.S.C. § 6.

We AFFIRM.

STATEMENT OF THE CASE

The subject matter on appeal is directed to a paperboard tube or sheet, which may be multi-layered. (Claims 1, 5, 15, and 19). According to Appellants, this paperboard may be used to form, *inter alia*, corrugated boxes. (Spec. 6).

Further details of the appealed subject matter are recited in claims 1, 5, 15, and 19, which are reproduced below:

1. A paperboard sheet comprising:
at least one layer containing cellulose fibers and a sufficient quantity of wood sawdust such that the resulting paperboard sheet contains between 1 and 40 percent wood sawdust by weight, wherein at least 95 percent of the sawdust by weight has a particle size greater than 350 micrometers and less than [sic] 3175 micrometers.

5. A multi-layer paperboard sheet comprising:
at least one relatively low-density paperboard layer containing cellulose fibers and a quantity of wood sawdust, wherein at least 95 percent of the sawdust by weight has a particle size greater than 350 micrometers and less than [sic] 3175 micrometers;

at least one relatively high-density layer containing cellulose fibers, wherein there is at least a 1% difference in density between the at least one relatively low-density layer and the at least one relatively high-density layer; and

wherein the at least one relatively low-density layer and the at least one relatively high density layer are joined together producing a multi-layer

paperboard sheet, and wherein the resulting paperboard sheet contains between 1 and 40 percent wood sawdust by weight.

15. A paperboard tube comprised of a plurality of paperboard plies, wherein

at least one of the plies has at least one layer that contains cellulose fibers and a sufficient quantity of wood sawdust such that the resulting at least one paperboard ply contains between 1 and 40 percent wood sawdust by weight, wherein at least 95 percent of the sawdust by weight has a particle size greater than 350 micrometers and less than [sic] 3175 micrometers; and

wherein said plurality of paperboard plies are wound about an axis and adhered together to form a paperboard tube.

19. A paperboard tube comprised of:

a paperboard ply having at least one layer containing cellulose fibers and a sufficient quantity of wood sawdust such that the resulting paperboard ply contains between 1 and 40 percent wood sawdust by weight, wherein at least 95 percent of the sawdust by weight has a particle size greater than 350 micrometers and less than [sic] 3175 micrometers; and

wherein the paperboard ply is wound about an axis and overlapped on itself and adhered together to form a low-density paperboard tube.

As evidence of unpatentability of the claimed subject matter, the Examiner relies upon the following references²:

² We also note that Appellants refer to the Sigma-Aldrich Co. document "Catalog/Handbook of Fine Chemicals" in the Evidence Appendix section of the Appeal Brief. (App. Br. 13). However, Appellants do not dispute the Examiner's statement in the Answer that this document was not entered into the record. (*Compare* Ans. 4 *with* Reply Brief in its entirety). Since this document is not of record, we shall not consider it. 37 C.F.R. § 41.37(c)(1)(ix) (2007). Moreover, the Evidence Appendix erroneously contains the following reference: Clark, James d'A., "Pulp Technology and Treatment for Paper," Second Ed., Miller Freeman Publications, Inc., p. 473 (1985) (hereinafter "Clark"). Appellants do not rely on Clark to support any arguments made in the Appeal Brief, so why it was included in the Evidence

Clapp	US 1,765,860	June 24, 1930
McCowan	US 5,203,965	Apr. 20, 1993
Gomez	US 5,227,024	Jul. 13, 1993
Qui	US 5,505,395	Apr. 9, 1996
Chance	US 5,770,013	Jun. 23, 1998
Howard	US 6,033,352	Mar. 7, 2000

Appellants seek review of the following rejections³:

- 1) Claims 1-4 under 35 U.S.C. § 103(a) as unpatentable over the disclosure of Chance in view of the disclosure of Clapp or McCowan;
- 2) Claims 5-18 under 35 U.S.C. § 103(a) as unpatentable over the disclosure of Chance in view of the disclosure of Clapp or McCowan and further in view of the disclosures of Gomez and Qui; and
- 3) Claims 19-22 under 35 U.S.C. § 103(a) as unpatentable over the disclosure of Chance in view of the disclosure of Clapp or McCowan and further in view of the disclosures of Gomez, Qui, and Howard.

With respect to rejection (1), Appellants separately argue independent claim 1. (App. Br. 5-10 and Reply Br. 1-3). Appellants do not advance any specific argument regarding the rejection of the remaining claims, which ultimately depend from independent claim 1. *Id.* Instead, Appellants refer to their arguments made in connection with the rejection of independent

Appendix is unclear. Additionally, Appellants do not indicate where Clark was entered into the record as required by 37 C.F.R. § 41.37(c)(1)(ix) (2007). For the above reasons, we have not considered Clark.

³ As is apparent from pages 4-9 of the Answer, the Examiner has withdrawn the § 103(a) rejection over the disclosure of Clapp set forth in the Final Office Action mailed September 30, 2006.

claim 1. *Id.* Accordingly, we address Appellants' arguments with respect to independent claim 1 only.

With respect to rejection (2), Appellants separately argue independent claims 5 and 15. (App. Br. 10-12 and Reply Br. 1-3). Appellants do not advance any specific argument regarding the rejection of the remaining claims, which ultimately depend from independent claim 5 or 15. *Id.* Instead, Appellants refer to their arguments made in connection with the rejection of either independent claim 5 or 15. *Id.* Accordingly, we address Appellants' arguments with respect to independent claims 5 and 15 only.

With respect to rejection (3), Appellants separately argue independent claim 19. (App. Br. 12-13 and Reply Br. 1-3). Appellants do not advance any specific argument regarding the rejection of the remaining claims, which ultimately depend from independent claim 19. *Id.* Instead, Appellants refer to their arguments made in connection with the rejection of independent claim 19. *Id.* Accordingly, we address Appellants' arguments with respect to independent claim 19 only.

ISSUES

With respect to rejections (1), (2), and (3), the Examiner determines (Ans. 4-9) that Chance in combination with Clapp or McCowan would have suggested a paperboard sheet or tube having the recited particle size of wood sawdust. Appellants argue (App. Br. 7) that "[t]here is no disclosure, teaching or suggestion in Clapp that would direct one of skill in the art to adopt a particle size between 350 to 420 μm ." Appellants argue (Reply Br. 2) that

Clapp further states that this sawdust-containing product is "not quite as satisfactory" as when wood flour is used. Clapp, page 2, lines 70-79. An objective reading of Clapp makes clear that the cellite/kieselguhr, sawdust, china clay slurry "forms" on the cylindrical mold *despite* the presence of the coarse sawdust and not because of it. Accordingly, one of ordinary skill in the art who was presented with Clapp would certainly not be taught, as the Examiner suggests, to use sawdust in a papermaking slurry in order to ensure good formation on a cylindrical papermaking mold.

In addition, Appellants argue that Clapp does not teach nor would have suggested the percentage of sawdust particles required by claims 1, 5, 15, and 19. (App. Br. 6). Specifically, Appellants argue that "Clapp discloses a '40 to 80 mesh sieve' and, despite omitting the customary positive (+) and negative (-) signs, appears to suggest that 90 percent of the 'finely divided sawdust' would pass through a 40 mesh sieve (420 μm) and be retained by an 80 mesh sieve (177 μm)." (App. Br. 6).

Appellants also argue (App. Br. 7) that

Clapp teaches away from adopting a composition of sawdust wherein the claimed percentage of sawdust is within the claimed particle size range. More specifically, Applicant respectfully submits that if one of ordinary skill in the art were to produce a paper carrier web from Clapp's less desired material, i.e., sawdust, such an artisan would be taught by Clapp to adopt a sawdust particle size distribution that is focused predominantly toward the disclosed lower limit of 177 μm to more closely approximate Clapp's more desired material, i.e., wood flour. . . .

In addition, Appellants argue that

McCowan teaches that longer wood fibers are preferred to shorter wood fibers when attempting to increase paper strength. Thus, if one of ordinary skill in the art were to apply McCowan to the task of

manufacturing relatively high-strength paperboard, such an artisan would be led to adopt a particle size distribution that is heavily focused toward the upper limit of the disclosed range (i.e., 6350 μm). McCowan thus teaches away from adopting a particle size distribution in the manufacture of paperboard that is heavily focused toward the lower end of the disclosed range (i.e., 1587.5 μm).

(App. Br. 9) (emphasis omitted). Also, Appellants argue (Reply Br. 2) that "[a]lthough suggesting that particles up to 6360 μm may have a sufficient TSF for making *tissue or writing paper*, McCowan does not teach or suggest that such a 'substantial TSF' would be sufficient for making a stronger *paperboard* product."

Thus, the first issue is: Have Appellants shown reversible error in the Examiner's determination that the combined teachings of Chance and Clapp or McCowan would have suggested a paperboard sheet or tube having at least 95 percent of the sawdust by weight with a particle size greater than 350 micrometers and less than 3175 micrometers as required by claims 1, 5, 15, and 19 within the meaning of § 103(a)? We decide this issue in the negative.

With respect to rejection (2), the Examiner determines (Ans. 4-9) that Chance in combination with the other cited prior art references would have suggested a paperboard sheet or tube having the recited particle size range of wood sawdust.

Appellants argue (App. Br. 10-12) that

[Gomez teaches away from the claimed invention because] its low-density filler is comprised of a pulverized vegetable filler or wood waste material wherein "at least 95% by weight of the particles . . . are less than 150 micrometers in size and at least 80 % by weight of the particles are greater than 10 micrometers in size."

Appellants also argue (App Br. 11) that

[Because] the Qui reference does not teach or suggest that such differing densities are attributable to the use of sawdust within a low-density paperboard layer[,] . . . Qui cannot teach or suggest that "at least 95 percent of the sawdust by weight has a particle size greater than 350 micrometers and less than 3175 micrometers."

Thus, the second issue is: Have Appellants shown reversible error in the Examiner's determination that Chance in combination with the other cited prior art references would have suggested a paperboard sheet or tube having at least 95 percent of the sawdust by weight with a particle size greater than 350 micrometers and less than 3175 micrometers as required by claims 5 and 15 within the meaning of § 103(a)? We decide this issue in the negative.

With respect to rejection (3), the Examiner finds (Ans. 4-9) reasons for combining the cited prior art references. Appellants argue that the combination of the cited prior art references "is impermissibly based on hindsight. There is no implicit or explicit motivation, outside of Applicant's present disclosure to combine this vast array of references." (App. Br. 13).

Thus, the third issue is: Have Appellants shown reversible error in the Examiner's reasons for combining the cited prior art references (i.e., Chance, McCowan or Clapp, Gomez, Qui, and Howard) within the meaning of § 103(a)? We decide this issue in the negative.

RELEVANT FINDINGS OF FACT (FF)

1. Appellants do not specifically dispute the Examiner's finding that

Chance et al discloses a 3-ply paperboard comprising wood (cellulose) fibers and sawdust. The wood fiber material is present in an amount of about 20-25% by weight of the paperboard and comprises from 5-70% sawdust (col 4, lines 36-39 and col 8, lines 32-38). Thus, the amount of sawdust that can be present by weight of the multi-ply paperboard can be from 1 to 17.5%, which significantly overlaps the claimed ranges.

....

Clapp discloses a multi-layer liner board or paper comprising a bottom layer containing cellulosic fibers and a top layer having 5-20 parts by weight bleached sulphite pulp, 10-20 parts wood flour . . . and 75 to 105 parts other material (Claim 1; p 1, lines 58-72; p2, lines 5-13, 70-74). . . . The sawdust particles are capable of passing through a 40-80 mesh sieve, or having a particle size range from about 177 to about 420 μm (p2, lines 5-13, 71-74). . . .

....

McCowan et al discloses that making a paper using sawdust that has been screened to a particle size of greater than about 1/16 inch (about 1590 μm) results in paper having good strength properties (TSF factor). McCowan also discloses that the paper can have at least 30% sawdust (Abstract; col 1, lines 37-44; col 4, line 51 to col 5, line 11).

....

. . . McCowan discloses . . . sawdust with particle sizes in the upper portion of the claimed range to obtain good strength properties.

....

The only size criteria recited by McGowan for the portion of sawdust useable in papers is that the particle size fraction separated by the number 3 and 12 screens (about 1590 to 6000 micrometers) provides substantial TSF value. . .

(Compare Ans. 5-16 with App. Br. 5-14 and Reply Br. 1-3).

2. Clapp teaches "paper or card-board" made from, *inter alia*, wood flour. (Clapp, p. 1, ll. 1-20). Clapp teaches that this wood flour is useful as a "carrier" for the purpose of "forming" on a cylinder mold of a paper machine. (Clapp, p. 2, ll. 35-43). Although Clapp states

- that "in my opinion the results are not quite as satisfactory when finely-divided sawdust is used as when wood flour is used," nowhere does Clapp discourage the use of sawdust. (Clapp, p. 2, ll. 75-78). To the contrary, Clapp states that "I would not consider it a departure from the spirit and scope of the invention if one were to . . . substitute . . . wood flour [for] . . . sawdust." (Clapp, p. 2, ll. 68-72).
3. McCowan teaches using sawdust as an ingredient in paper products, one of which may be a cardboard box. (McCowan col. 1, ll. 15-34 and col. 2, ll. 7-8). Although McCowan teaches that prior to its invention "[a] high TSF [total strength factor] requirement generally demands a greater proportion of long fibered pulp," nowhere does McCowan discourage the use of the lower limit of its particle size range of 1590 - 6000 micrometers. (McCowan, col. 1, ll. 42-44 and FF 1). To the contrary, McCowan states a sawdust "particle that will pass through a number 12 screen . . . has no perceived TSF value. Yet particles about that size and up to number 3 screen size . . . ha[ve] [a] substantial TSF value." (McCowan, col. 4, ll. 51-56).
 4. Although McCowan discloses (col. 2, ll. 6-9) in its preferred embodiments that sawdust is an ingredient in tissue and writing paper products, McCowan does not limit its disclosure to only these products. Indeed, McCowan discloses that "[t]his invention relates to utilization of sawdust . . . for paper production" and that "different types of paper are produced from wood pulp." (McCowan, col. 1, ll. 9-27). These different types of paper include, *inter alia*, cardboard boxes. (McCowan, col. 1, ll. 25-36).

5. Appellants do not dispute the Examiner's finding that Qui teaches "a spirally wound paperboard tube having multiple plies of lower and higher densities . . . [and] that the plies are coated with adhesive prior to winding to adhere them together . . . [and] that the density of paperboard can be varied by varying raw materials or additives."
(*Compare* Ans. 7-8 with App. Br. 5-14 and Reply Br. 1-3). Also, with respect to rejection (2), Appellants do not dispute the Examiner's reasons for combining Chance with Qui and Clapp or McCowan.
(*Compare* Ans. 8-9 and 16 with App. Br. 5-14 and Reply Br. 1-3).
6. Although Gomez discloses that "if the particles of micronized vegetable filler have mean dimensions equal to or larger than 150 micrometers, the resulting fibrous sheet product exhibits uniformity defects, especially formation defects," this does not constitute a teaching away from using sawdust having a particle size in the recited range to decrease the density of the sheet. (Gomez, col. 6, ll. 13-16).
7. Additionally, Appellants do not dispute the Examiner's finding that Gomez teaches that it is well known in the art that vegetable fillers (e.g., wood waste obtained from sawing) decrease the density of paper. (*Compare* Ans. 8, 14, 16 with App. Br. 5-14 and Reply Br. 1-3).
8. Appellants do not dispute the Examiner's finding that "Howard . . . teaches that it was known in the art to wind paperboard tubes with plies overlapping at the seams to form a spirally wound tube."
(*Compare* Ans. 16 with App. Br. 5-14 and Reply Br. 1-3). In this regard, Howard teaches a trimmed ply 62 is applied to an adhesive

coated surface of paperboard ply 50 to form a spiral seam 68 in order to "provid[e] spiral wound tubes of improved uniformity, appearance, and/or strength." (Howard, col. 4, ll. 40-45 and col. 6, ll. 30-47).

PRINCIPLES OF LAW

"In cases involving overlapping ranges, we and our predecessor court have consistently held that even a slight overlap in range establishes a *prima facie* case of obviousness." *In re Peterson*, 315 F.3d 1325, 1329 (Fed. Cir. 2003).

"[O]ne cannot show non-obviousness by attacking references individually where . . . the rejections are based on combinations of references." *In re Keller*, 642 F.2d 413, 426 (CCPA 1981).

"Any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning . . ." *In re McLaughlin*, 443 F.2d 1392, 1395 (CCPA 1971). Reconstruction is proper if it relies upon knowledge within the level of ordinary skill at the time of the invention and not upon knowledge gained solely from Appellants' disclosure. *Id.*

It is well settled that "a reference must be considered in its entirety, and it is well established that the disclosure of a reference is not limited to specific working examples contained therein." *In re Fracalossi*, 681 F.2d 792, 794 n.1 (CCPA 1982).

"A reference may be said to teach away when a person of ordinary skill, upon reading the reference, would be discouraged from following the path set out in the reference, or would be led in a direction divergent from the path that was taken by the applicant." *In re Gurley*, 27 F.3d 551, 553 (Fed. Cir. 1994). "A known or obvious composition does not become

patentable simply because it has been described as somewhat inferior to some other product for the same use." *Id.* "[T]he fact that a specific [embodiment] is taught to be preferred is not controlling, since all disclosures of the prior art, including unpreferred embodiments, must be considered." *Merck & Co. v. Biocraft Labs., Inc.*, 874 F.2d 804, 807 (Fed. Cir. 1989).

"[W]here the prior art gives reason or motivation to make the claimed [invention] . . . the burden (and opportunity) then falls on an applicant to rebut that *prima facie* case. Such rebuttal or argument can consist of . . . any other argument or presentation of evidence that is pertinent." *In re Dillon*, 919 F.2d 688, 692-93 (Fed. Cir. 1990) (*en banc*).

It is well settled that objective evidence must be factually supported by an appropriate affidavit or declaration. *See In re De Blauwe*, 736 F.2d 699, 705 (Fed. Cir. 1984).

A factual finding not shown by Appellants to be erroneous may be accepted as fact. *In re Kunzmann*, 326 F.2d 424, 426 n. 3 (CCPA 1964).

ANALYSES AND CONCLUSIONS

ISSUE (1): Have Appellants shown reversible error in the Examiner's determination that the combined teachings of Chance and Clapp or McCowan would have suggested a paperboard sheet or tube having at least 95 percent of the sawdust by weight with a particle size greater than 350 micrometers and less than 3175 micrometers as required by claims 1, 5, 15, and 19 within the meaning of § 103(a)?

Rejections based on Clapp

With respect to rejections (1), (2), and (3), Appellants do not dispute that the combined teachings of Chance and Clapp would have taught or suggested all the features of claims 1, 5, 15, and 19, except for the recited percentage of sawdust having the recited particle size range. (*Compare* Ans. 4-17 *with* App. Br. 5-14 and Reply Br. 1-3; *see also* FF 1). Appellants argue (App. Br. 7) that "[t]here is no disclosure, teaching or suggestion in Clapp that would direct one of skill in the art to adopt a particle size between 350 to 420 μm ." We disagree.

Clapp teaches "paper or card-board" (paperboard) made from, *inter alia*, wood flour or sawdust. (FF 1-2). Appellants do not dispute the Examiner's determination that Clapp's sawdust has a particle size range from about 177 to about 420 micrometers. (FF 1). Implicit in this teaching is that 100% of the sawdust has a particle size range from about 177 to about 420 micrometers. Thus, we determine that Clapp's percentage of sawdust meets the recited percentage of sawdust particles.

Thus, because Clapp's particle size range overlaps the recited particle size range, we agree with the Examiner's determination that Clapp would have suggested to one of ordinary skill in the art to employ wood sawdust having the recited particle size range within the meaning of 35 U.S.C. § 103(a). *Peterson*, 315 F.3d at 1330. In addition, because the Examiner uses the knowledge of those skilled in the art at the time of the invention as a reason for employing sawdust having the recited particle size range, we determine that the Examiner does not use impermissible hindsight in

determining the combined teachings of Chance and Clapp would have rendered obvious the claimed invention.

Appellants next argue that Clapp teaches away from the recited particle size range because one of ordinary skill would "adopt a sawdust particle size distribution that is focused predominantly toward the disclosed lower limit of 177 μm to more closely approximate Clapp's more desired material, i.e., wood flour." (App. Br. 7). Appellants' assertion that the 177 micrometer sawdust "more closely approximate[s]" the particle size of wood flour is merely attorney argument with no basis in fact. It is well settled that objective evidence must be factually supported by an appropriate affidavit or declaration. *See De Blauwe*, 736 F.2d at 705. In this case, Appellants have not provided any persuasive evidence in an affidavit or declaration to support their argument. Moreover, Appellants have not directed us to any persuasive evidence in the record to support their argument.

Accordingly, given that Appellants' argument is unsupported by any factual evidence, we determine that Clapp does not teach away from the recited range.

Appellants also argue that there is no reason to use sawdust in Clapp's papermaking slurry because Clapp teaches that its papermaking slurry "forms" on the cylindrical mold despite the presence of sawdust. (Reply Br. 2). Appellants' argument misses the mark. Although Clapp states that "in my opinion the results are not quite as satisfactory when finely-divided sawdust is used as when wood flour is used," Clapp also states that "I would not consider it a departure from the spirit and scope of the invention if one were to . . . substitute . . . wood flour [for] . . . sawdust." (FF 2).

Thus, given that Clapp teaches two embodiments for its papermaking slurry: one slurry composed of wood flour and the other slurry composed of sawdust, we agree with the Examiner's determination that Clapp teaches sawdust as an ingredient in its papermaking slurry.

Appellants allege that "Clapp discloses a '40 to 80 mesh sieve' and, despite omitting the customary positive (+) and negative (-) signs, appears to suggest that 90 percent of the 'finely divided sawdust' would pass through a 40 mesh sieve (420 μm) and be retained by an 80 mesh sieve (177 μm).\" (App. Br. 6). We do not find this allegation to be persuasive.

On this record, Appellants' allegation is merely attorney argument with no basis in fact. Appellants have not provided any evidence to support their allegation that "90 percent of the 'finely divided sawdust' would pass through a 40 mesh sieve (420 μm) and be retained by an 80 mesh sieve (177 μm).\" Thus, we cannot agree with Appellants that Clapp would not have suggested this feature.

Therefore, because we determine that the Examiner has established a prima facie case of obviousness, the burden properly shifted to Appellants to present persuasive arguments or evidence refuting the prima facie case. However, on this record, Appellants have not done so.

Accordingly, it follows that Appellants have not shown reversible error in the Examiner's determination that Chance in view of Clapp would have suggested a paperboard sheet or tube having at least 95 percent of the sawdust by weight with a particle size greater than 350 micrometers and less than 3175 micrometers as required by claims 1, 5, 15, and 19.

Rejections based on McCowan

With respect to rejections (1), (2), and (3), Appellants do not dispute that the combined teachings of Chance and McCowan would have taught or suggested all the features of claims 1, 5, 15, and 19, except for the recited percentage of sawdust having the recited particle size range. (*Compare* Ans. 4-17 *with* App. Br. 5-14 and Reply Br. 1-3; see also FF 1).

Appellants argue that "if one of ordinary skill in the art were to apply McCowan to the task of manufacturing relatively high-strength paperboard, such an artisan would be led to adopt a particle size distribution that is heavily focused toward the upper limit of the disclosed range (i.e., 6350 μm)." (App. Br. 9)(emphasis omitted). We do not agree.

McCowan teaches using sawdust as an ingredient in paper products, one of which may be a cardboard box (paperboard). (FF 3). Appellants do not specifically dispute the Examiner's finding that McCowan teaches using sawdust having a particle size range from about 1,590 to 6,000 micrometers. (FF 1). Implicit in this teaching is that 100% of the sawdust has a particle size range from about 1,590 to 6,000 micrometers.

Thus, we agree with the Examiner's determination that McCowan would have suggested to one of ordinary skill in the art to employ the recited particle size range of wood sawdust within the meaning of 35 U.S.C. § 103(a). *Peterson*, 315 F.3d at 1330.

Appellants next argue that "[a]lthough [McCowan] suggest[s] that particles up to 6360 μm may have a sufficient TSF for making tissue or writing paper, McCowan does not teach or suggest that such a 'substantial TSF' would be sufficient for making a stronger paperboard product." (Reply

Br. 2) (emphasis omitted). Although McCowan discloses in its preferred embodiments that sawdust is an ingredient in tissue and writing paper products, McCowan does not limit its disclosure to only these products. (FF 4). Indeed, McCowan discloses that "[t]his invention relates to utilization of sawdust . . . for paper production" and that "different types of paper are produced from wood pulp." (FF 4). These different types of paper include, *inter alia*, cardboard boxes. (FF 4). Thus, we agree with the Examiner's determination that McCowan teaches using sawdust as an ingredient in its cardboard boxes.

With respect to Appellants' "teaching away" argument, although McCowan teaches that prior to its invention "[a] high TSF [total strength factor] requirement generally demands a greater proportion of long fibered pulp," nowhere does McCowan discourage the lower limit of its particle size range of 1590 - 6000 micrometers. (FF 3).

To the contrary, McCowan states a sawdust "particle that will pass through a number 12 screen . . . has no perceived TSF value. Yet particles about that size and up to number 3 screen size . . . ha[ve] [a] substantial TSF value." (FF 3). In other words, sawdust particles sized from about 1,590 micrometers and larger have a substantial (i.e., high) TSF value. (FF 1, 3). Thus, merely because McCowan teaches that prior to its invention long fibered pulp was required to obtain a high TSF value does not constitute a teaching away from McCowan's teaching in its preferred embodiment that sawdust particles of about 1,590 micrometers and larger having a high TSF value.

Therefore, because a prima facie case of obviousness has been established, we determine that the burden properly shifted to Appellants to present persuasive arguments or evidence refuting the prima facie case. However, on this record, Appellants have not done so.

Thus, it follows that Appellants have not shown reversible error in the Examiner's determination that Chance in view of McCowan would have suggested a paperboard sheet or tube having at least 95 percent of the sawdust by weight with a particle size greater than 350 micrometers and less than 3175 micrometers as required by claims 1, 5, 15, and 19 within the meaning of § 103(a).

ISSUE (2): Have Appellants shown reversible error in the Examiner's determination that Chance in combination with the other cited prior art references would have suggested a paperboard sheet or tube having at least 95 percent of the sawdust by weight with a particle size greater than 350 micrometers and less than 3175 micrometers as required by claims 5 and 15 within the meaning of § 103(a)?

With respect to Appellants' arguments in rejection (2) directed to Qui and Gomez, it is well settled that one cannot show non-obviousness by attacking the references individually when the rejection is based on a combination of references. *Keller*, 642 F.2d at 426.

As stated above, the Examiner relies on Clapp or McCowan to teach the recited particle size range of wood sawdust. Appellants do not dispute the Examiner's finding that Chance teaches a three-ply paperboard comprising, *inter alia*, wood fibers and sawdust. (FF 1). In addition, Appellants do not dispute the Examiner's finding that Qui teaches "a spirally

wound paperboard tube having multiple plies of lower and higher densities . . . [and] that the plies are coated with adhesive prior to winding to adhere them together . . . [and] that the density of paperboard can be varied by varying raw materials or additives." (FF 5). Appellants also do not dispute the Examiner's finding that Gomez teaches that it is well known in the art that vegetable fillers (e.g., wood waste obtained from sawing) decrease the density of paper. (FF 5). In addition, Appellants not dispute the Examiner's reasons for combining Chance with Qui and Clapp or McCowan. (FF 5).

Therefore, we agree with the Examiner's determination that one of ordinary skill in the art would have been led to design a multi-layered paperboard sheet or paperboard tube having a plurality of paperboard plies as taught by Chance and Qui using Clapp or McCowan's paperboard, which is known to have a low density, to provide structural strength.

In reaching this determination, we have considered Appellants' argument that Gomez teaches away from the claimed paperboard. (App. Br. 10). Although Gomez discloses that "if the particles of micronized vegetable filler have mean dimensions equal to or larger than 150 micrometers, the resulting fibrous sheet product exhibits uniformity defects, especially formation defects," this does not constitute a teaching away from using sawdust having a particle size in the recited range to decrease the density of the sheet. (FF 6).

If sawdust having a particle size in the recited range is used as suggested by Clapp or McCowan, one of ordinary skill would have understood that formation defects would have been a trade-off. However, such a trade-off does not amount to discouraging the use of the recited

particle size range of sawdust to decrease the density. Accordingly, we do not find that Gomez teaches away from the recited particle size range of sawdust being greater than 350 micrometers and less than 3175 micrometers.

Thus, it follows that Appellants have not shown reversible error in the Examiner's determination that the combined teachings of Chance and the other cited prior art references would have suggested a paperboard sheet or tube having at least 95 percent of the sawdust by weight with a particle size greater than 350 micrometers and less than 3175 micrometers as required by claims 5 and 15.

ISSUE (3): Have Appellants shown reversible error in the Examiner's reasons for combining the cited prior art references (i.e., Chance, McCowan or Clapp, Gomez, Qui, and Howard) within the meaning of § 103(a)?

With respect to rejection (3), as stated above, Chance in combination with Clapp or McCowan teaches a paperboard having the recited particle size range of wood sawdust.

In addition, Appellants do not dispute the Examiner's finding that Gomez teaches that it is well known in the art that vegetable fillers (e.g., wood waste obtained from sawing) decrease the density of paper. (FF 7). Nor do Appellants dispute the Examiner's finding that "Howard . . . teaches . . . wind[ing] paperboard tubes with plies overlapping at the seams to form a spirally wound tube." (FF 8). In this regard, Howard teaches a trimmed ply 62 is applied to an adhesive coated surface of paperboard ply 50 to form a spiral seam 68 in order to improve the spiral wound tube's strength in order to "provid[e] spiral wound tubes of improved uniformity, appearance, and/or strength." (FF 8).

Thus, we agree with the Examiner's determination that one having ordinary skill in the art would have been led to design a paperboard tube as taught by Howard using the paperboard, which is known to have a low density, suggested by Chance in combination with Clapp or McCowan. In doing so, one of ordinary skill would have a reasonable expectation of successfully obtaining a spirally wound tube having good strength.⁴ Moreover, the Examiner does not use impermissible hindsight but, rather, the knowledge of those skilled in the art at the time of the invention as a reason for employing sawdust having the recited particle size range.

Thus, it follows that Appellants have not shown reversible error in the Examiner's reasons for combining the cited prior art references within the meaning of § 103(a).

ORDER

Therefore, based on the Factual Findings set forth in the Answer and above, we affirm the following:

1. The § 103(a) rejection of claims 1-4 over the disclosure of Chance in view of the disclosure of Clapp or McCowan;
2. The § 103(a) rejection of claims 5-18 over the disclosure of Chance in view of the disclosure of Clapp or McCowan and further in view of the disclosures of Gomez and Qui; and
3. The § 103(a) rejection of claims 19-22 over the disclosure of Chance in view of the disclosure of Clapp or McCowan and further in view of the disclosures of Gomez, Qui, and Howard.

⁴ We note that a discussion of Qui is unnecessary to resolve the issue raised.

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Accordingly, the decision of the Examiner is affirmed.

TIME PERIOD

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(v).

AFFIRMED

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